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THE KATAHDIN AND CHIPPEWA POTATOES

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ORIGIN

The two new varieties of potatoes, Katahdin[1] and Chippewa,[2] have been produced as the result of a plant-breeding program which has for its definite purpose the production by hybridization and selection of varieties of potatoes resistant to a virus disease known as mild mosaic.

When potato breeding was actively undertaken by the United States Department of Agriculture in 1910 the only disease resistance sought was that against the late-blight fungus (*Phytophthora infestans* (Mont.) DBy.). It was not until some years later that it became evident that the virus diseases were a vastly greater menace to potato production than late blight, because of the fact that potato viruses are transmitted from one crop to the next through tuber infection and, in addition, they cannot be controlled by fungicidal application to the foliage or by seed treatment.

The widespread occurrence of potato virus diseases, such as the various types of mosaic, leaf roll, spindle tuber, unmottled curly dwarf, and streak, necessitates the development of varieties resistant to such diseases. The first step in this direction was toward the development of varieties resistant to one of the most common virus diseases in Maine, mild mosaic.

Seedlings that were apparently resistant to virus infection were selected, and these were crossed with one another and with other seedlings and varieties in an attempt to obtain new varieties with a high degree of resistance to mild mosaic, combined with desirable tuber characters, good habit of vine growth, and productiveness. As the work progressed many very promising seedlings were obtained, but when subjected to the necessary tests the majority of them became infected with one or more types of virus disease or else proved to be unsatisfactory as to yield, table quality, or other desirable characteristics. A number of seedlings have been produced, however, that are highly resistant to mild mosaic in field trials and have, in addition, many other characters that are very desirable from the viewpoint of the commercial grower. Among these seedlings are the Katahdin and the Chippewa.

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[1] The name of the highest and most prominent mountain in Maine, the State in which this variety originated. This name is of Indian origin and signifies "venerable mountain".

[2] The name of a tribe of Indians who occupied the region from Lake Huron to North Dakota.

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These two varieties were first grown in 1923 at Aroostook Farm, Presque Isle, Maine. They originated as the result of a cross between two unnamed seedling varieties, nos. 24642 and 40568, each of which was obtained by crossing two commercial varieties. The complete pedigree is as follows:

Katahdin (U.S.D.A. seedling no. 42667) Chippewa (U.S.D.A. seedling no. 42672)	U.S.D.A. seedling no. 40568 × U.S.D.A. seedling no. 24642	Rural New Yorker No. 2 × Busola Aroostook Wonder × Sutton Flourball

In selecting the parents for this cross the chief characteristics given special consideration were resistance to mild mosaic and good shape of tubers. Studies of the parent varieties had shown that both appeared to possess considerable resistance to mild mosaic. This resistance has evidently been transmitted to the progeny, since both Katahdin and Chippewa, as well as other seedlings derived from the same cross, have so far given evidence of being very highly resistant to this disease. The type of tuber characters desired was found in seedling no. 40568, which was used as the female parent. The tubers of this variety were of good proportions, regular in outline, with smooth surface and shallow eyes. These characters are found to a high degree in both the Katahdin and the Chippewa.

Although both parents were comparatively low in yield so far as observations indicated, the combination resulted in increased vigor, as is evident from several high-yielding seedlings in this progeny.

KATAHDIN

DESCRIPTION

Plants medium to large, spreading; stems thick, prominently angled; nodes slightly swollen, green; internodes slightly reddish purple or green; wings slightly waved or straight, green; stipules large, green, glabrous; leaves very long, broad, midrib green and scantily pubescent; primary leaflets close, medium green, 4 pairs, large, ovate, mean length 77.23±0.55 mm (3.04 inches), mean width 49.07±0.38 mm (1.93 inches), index 63.54±0.27[3]; petioles green; secondary leaflets many, 3 positions—on midrib between pair of primary leaflets, at junction of midrib and petioles of primary leaflets, on primary leaflet petioles; tertiary leaflets medium to many in number; inflorescence much branched, leafy bracts none; peduncles short to medium, pubescence scant; pedicels medium to long, green, pubescence scant.

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[3] Calculated by dividing the width by the length of each of 100 leaflets and multiplying the average of these ratios by 100. The leaflets were taken from the fourth leaf from the top of the stem, one leaflet, the distal left lateral, being taken from each leaf. Since the potato leaflet is asymmetrical, the length was determined by taking the average of the measurements from the apex to the base of each respective lobe. This is a modification of the method described in the following work: SALAMAN, R. N. POTATO VARIETIES, pp. 163–170, Cambridge, 1926.

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Flowers.—Calyx lobe tips long, little pigmented to green, pubescence scant to abundant; corolla medium size, 30–32 mm (1.18 inches) diameter, color a light lilac (corresponding to Ridgway's[4] mauvette); anthers orange-yellow, pollen medium to abundant, good quality; style straight; stigma globose, multilobed, green.

Tubers short elliptical to roundish, medium thick, mean length, 82.05±0.20 mm (3.23 inches)[5], mean width 80.09±0.17 mm (3.16 inches)[5], mean thickness 60.53±0.20 mm (2.38 inches)[5]; indexes, width to length 97.80±0.32[6], thickness to width 75.74±0.30[7], thickness to length 73.90±0.32[7]; skin smooth, self-colored, dark cream-buff[8]; eyes shallow, same color as skin; eyebrows medium long, curved, medium prominent; flesh white; sprouts, color when developed in the dark, pale vinaceous-lilac (Ridgway); maturity late.

CHARACTERISTICS

The Katahdin potato has been under observation and test for 10 years at Presque Isle, Maine, during which time it has been entirely free from mild mosaic; however, it is not resistant to spindle tuber or to leaf roll. In comparative-yield tests at Presque Isle in 1930, 1931, and 1932 it yielded about the same as Green Mountain and Rural New Yorker.

Like all varieties of potatoes, the Katahdin varies somewhat in cooking quality, according to the environmental conditions under which it is grown. Cooking tests, however, show that tubers of high quality are produced when this variety is grown under favorable conditions. The results of cooking tests made in cooperation with the Bureau of Home Economics of the United States Department of Agriculture at different times have shown the quality of the stock grown at Aroostook Farm, Presque Isle, Maine, to range from fair to very good, with good as the average, these terms being used to designate the three highest classes for quality in a scale of five.

Reports from cooperators in other sections of the country show that the Katahdin compares favorably in cooking quality with standard varieties when grown under the same conditions. The report from California states that it is desirable from the standpoint of eating quality. The four growers who tested the variety in Massachusetts in 1932 also report very favorably on the eating quality. The 1932 report from Michigan says that the high-quality flesh of the potato appeals very much to the housewife. The Oregon report for the same year states that the Katahdin was equal to the Russet Burbank (Netted Gem) and Burbank in every respect and was superior in some qualities.

The tubers are smooth, short elliptical to roundish, with few, very shallow eyes (fig. 1). The ability to maintain this desirable shape under adverse soil and climatic conditions is an important characteristic of this variety. It also consistently produces a very high percentage of no. 1 potatoes. These valuable features have been emphasized in reports from Michigan, North Dakota, and Oregon.

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[4] RIDGWAY, R. COLOR STANDARDS AND COLOR NOMENCLATURE, 43 pp., illus. Washington, D.C., 1912.

[5] The average of measurements of 100 tubers, each of a weight of approximately 8 ounces (223–233 g).

[6] Calculated by dividing the width of each 100 tubers by the length and multiplying the average of these ratios by 100. The data used for calculating the indexes were taken from the same measurements as those used to designate the dimensions of the tubers.

[7] Based on measurements of the same tubers as those used for determining the width to length index, using the same methods of calculation.

[8] Between Ridgway's chamois and cream-buff; classed as a white potato by the commercial trade.

Under the conditions of storage at Presque Isle, observations have shown the keeping quality of the tubers to be very good.

ADAPTATION

The Katahdin has been given extensive tests for the last 3 years (1930–32) to determine its adaptation. These tests have been made as part of the cooperative potato-breeding program which is being carried on between the United States Department of Agriculture and a number of the State experiment stations.

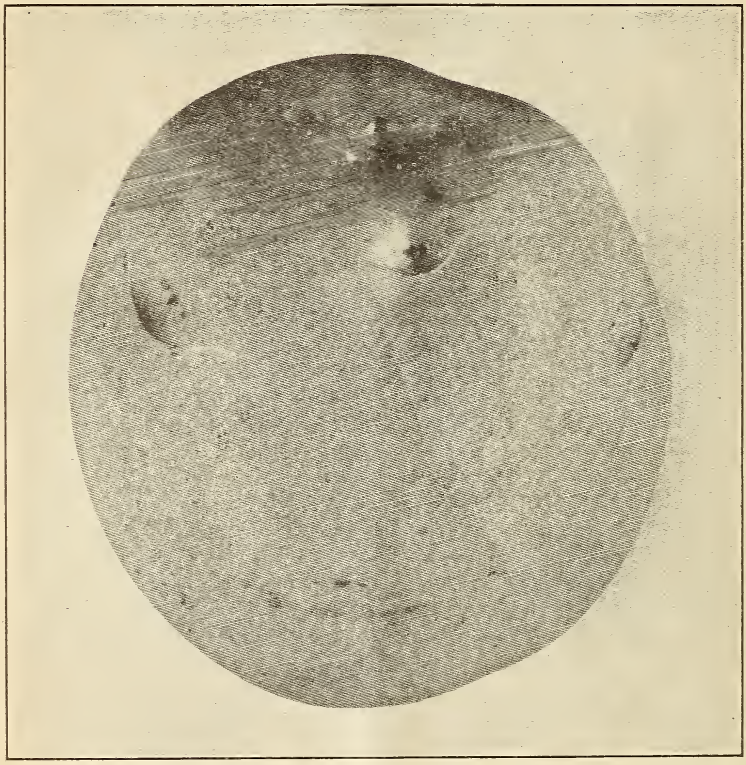

FIGURE 1.—The Katahdin potato.

It seems to be adapted to the higher altitudes of North Carolina. The 1932 report from that State shows that it is in demand in the western part of the State because of the attractive appearance of the tubers and the large percentage of no. 1 potatoes produced. There are indications also that it will replace varieties of the Rural group of potatoes in some of the higher altitudes of Colorado.

In 1931 and 1932 the Katahdin was grown in Oregon in comparison with the Russet Burbank (Netted Gem) and Burbank. The 1932 report showed that in Lane County 90 percent of the Katahdin tubers graded no. 1, whereas the Burbank varieties grown on the same farms and under like conditions graded approximately 50 percent.

Reports from Michigan and Iowa indicate that the Katahdin will replace the Rural varieties in those States, at least in part. Under conditions favoring the Rurals the Katahdin is about on a par with them, but under adverse conditions such as prevailed in Michigan in 1931 the Katahdin consistently outyielded the Russet Rural. In Ohio it did not show any superiority over the Rural New Yorker No. 2 in 1931 and 1932.

DISSEMINATION

As a part of the cooperative potato-breeding program, extensive tests of the Katahdin were made in 1931 and 1932 and are being continued in 1933. The seed stock that the United States Department of Agriculture has been able to produce has been placed with the cooperating State experiment stations for these tests. The Department has no seed for general distribution. Four growers (2 in Maine, 1 in North Carolina, and 1 in Oregon) produced small quantities of certified seed of Katahdin in 1932. A few other growers had increase plots of this variety, but they made no attempt to have their crop certified.

CHIPPEWA

DESCRIPTION

Plants medium to large, spreading; stems thick, prominently angled; nodes slightly swollen, green; internodes slightly reddish purple; wings slightly waved or straight, green; stipules medium large, green, glabrous; leaves long, broad, midrib green, pubescent; primary leaflets close, green, four pairs, large, ovate, mean length 84.65±0.43 mm (3.33 inches), mean width 47.46±0.27 mm (1.87 inches), index 56.27±0.18[9]; petioles green; secondary leaflets medium in number, on midrib between pairs of primary leaflets; tertiary leaflets none; inflorescence medium in branching; leafy bracts medium in number to none; peduncles short to medium, pubescence scant; pedicels medium in length, little pigmented, pubescence scant.

Flowers.—Calyx lobe tips long, little pigmented to green, pubescence scant; corolla medium in size, color a light lilac (Ridgway's mauvette) with white tips; anthers pale orange-yellow, pollen scant, poor; style straight, stigma globose, green.

Tubers elliptical to oblong, medium thick, mean length 89.05±0.28 mm (3.51 inches)[10], mean width 78.77±0.22 mm (3.10 inches), mean thickness 57.27±0.16 mm (2.26 inches); indexes, width to length 88.73±0.45[11], thickness to width 72.84±0.30[12], thickness to length 64.52±0.34[12]; skin smooth, self-colored, dark creamy buff[13]; eyes shallow, same color as skin; eyebrows medium long, curved, medium prominent; flesh white; sprouts, color when developed in the dark, creamy white with tips of scales a very dilute tint of pale rose purple (Ridgway); maturity medium late, about midway between Irish Cobbler and Green Mountain.

CHARACTERISTICS

The Chippewa potato has shown a high degree of resistance to mild mosaic. In a total of nearly 10,000 plants of this variety grown on the breeding plots at Presque Isle during the 10 years in which it has been grown, only 7 plants showing mosaic symptoms have been found; 5 of these showed the rugose type of mosaic, while the type occurring in the other 2 plants was undetermined. In the disease-resistance test plots, where this variety was grown between rows of Green Mountain stock known to be infected with mild mosaic, no Chippewa plants were found which showed symptoms of this disease, while under the same conditions 68 percent of the plants of the Green Mountain checks contracted the disease. The Chippewa is not resistant to leaf roll or spindle tuber.

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[9] See footnote 3.

[10] See footnote 5.

[11] See footnote 6.

[12] See footnote 7.

[13] See footnote 8.

The tubers are smooth, regular in outline, with very shallow eyes, oblong to elliptical, slightly longer in proportion to the width than the tubers of Katahdin (fig. 2).

Cooking tests of the Chippewa have shown that it is equal to the Rural New Yorker No. 2 in quality.

In all tests in which yield records have been obtained it has consistently been a high yielder. Comparative tests at Presque Isle have shown that in total tubers produced the Chippewa yielded significantly higher than Katahdin, Irish Cobbler, Green Mountain, and Rural New Yorker No. 2 for an average of 2 years (1931 and 1932). In the same tests it produced more no. 1 potatoes than any of the other four varieties, but in the light of the probable error there was not a significant difference in the number produced by the Chippewa, Katahdin, and Green Mountain.

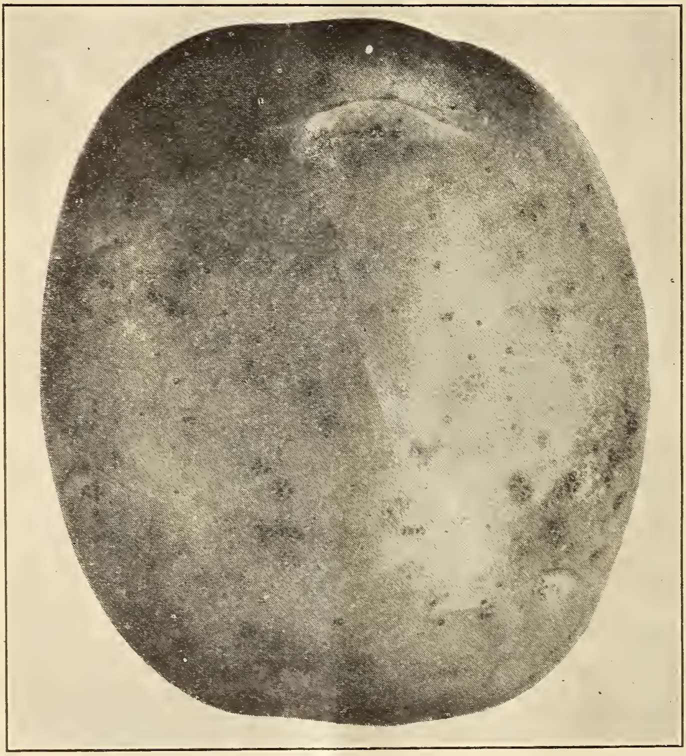

FIGURE 2.—The Chippewa potato.

A distinct advantage possessed by the Chippewa is its maturity before the usual time of digging the late crop. While it is not classed as an early variety, it matures somewhat earlier than Green Mountain and other late-maturing varieties.

ADAPTATION

In addition to the tests made at Presque Isle, Maine, a number of trials of the Chippewa variety have been conducted in other sections of the country. Four years' tests in Michigan and three in Minnesota have led to the conclusion that it is better adapted to certain conditions in these States than the Katahdin because of its earlier maturity.

DISSEMINATION

About 12 barrels of seed stock of the Chippewa were produced in 1932. Approximately half of this was sent to the cooperating experiment stations for placing with their growers for test and increase. The remainder was reserved for planting at Presque Isle for increase. No seed is available for distribution to growers except through the cooperation of the experiment stations.

SUMMARY

The Katahdin and Chippewa potatoes are resistant to mild mosaic, but not to leaf roll or spindle tuber. They are high-yielding varieties, producing tubers of excellent shape, with shallow eyes and desirable cooking quality.

The vines of the Katahdin mature late, but under some conditions the tubers set comparatively early. In several tests in Michigan, North Dakota, and Oregon the Katahdin has shown the ability to produce a good crop of tubers of desirable shape under adverse conditions.

Tests have indicated that it will replace the Rural varieties in parts of Michigan and Iowa and in the higher altitudes of Colorado and North Carolina, but probably not in Ohio. It has given excellent results in comparative tests with the Burbank varieties in Oregon.

The Chippewa resembles the Katahdin in many of its characteristics, though it differs from it somewhat in shape, the tubers being on the average slightly longer in relation to their width than the tubers of the Katahdin. It is considerably earlier than the Katahdin and somewhat earlier than the Green Mountain, and for this reason it is probably better adapted to certain parts of Michigan and Minnesota and other States where similar conditions prevail. In tests at Presque Isle, Maine, it consistently yielded higher than the Katahdin, Irish Cobbler, Green Mountain, and Rural New Yorker No. 2 in total number of bushels per acre.

The United States Department of Agriculture has no seed for general distribution.

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